

# TRS-80<sup>\*</sup>

**creative  
computing  
software**



# GRAPHING PACKAGE

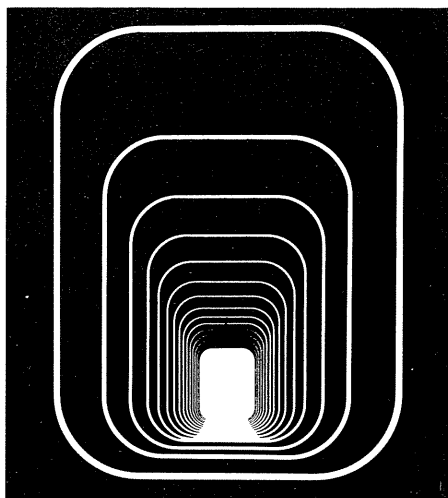
**32K CS-3301 Cassette \$19.95**

**32K CS-3803 Diskette \$24.95**

*\*For TRS-80 Model I<sup>®</sup>, LNW-80<sup>®</sup>, PMC-80<sup>®</sup>, PMC-81<sup>®</sup>, and Video Genie<sup>®</sup> computers. These programs will work on a TRS-80 Model III<sup>®</sup> computers if loaded to another disk using the Radio Shack CONVERT utility.*

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## GRAPHING PACKAGE

This package contains a variety of useful graphing routines. Four of the six programs plot different types of graphs. The other two programs calculate regression functions.

The first program, Bar Graph, will plot up to six items on a bar graph or line graph.

Cartesian Coordinate Graphing, the second program, plots a standard X,Y graph from a function entered by the user. The Y-axis is scaled automatically.

The next program, Polar Coordinate Graphing, plots polar functions entered by the user, automatically scaling and labeling all axes. The user inputs the range and increment of the plot.

The fourth program, Parametric Graphing, plots two parametric functions on the x,y plane within a user specified range.

The last two programs are regression programs. Linear Regression will analyze a series of x,y points, and provide the equation for the best-fit line. Parabolic Regression analyzes a series of x,y points and provides the equation for the best-fit parabola. The formulas from these programs can be entered into the graphing routines.

The screen dump routines for graphics printers included in the first four programs are written for the EPSON MX-80 printer, one of the most popular TRS-80 compatible graphics printers. Owners of graphics printers other than the EPSON MX-80 may have to alter these graphics routines.

## Disk Loading Instructions

If you have the disk version of Graphing Package, insert the disk in drive 0 of the computer, and hit RESET. The menu for the package will automatically load.

To choose a program to run, press the up-arrow or down-arrow key until the flashing block character is opposite the program that you want to run. Pressing ENTER will load and execute the program. After each program is finished, the menu program will come on the screen.

Note: The disk version of Graphing Package runs on the TRS-80 Model I computer. If you have a Model III computer, you must convert the disk using the CONVERT utility found on the Model III TRSDOS disk.

## Cassette Loading Instructions

If you have the cassette version of Graphing Package, place the cassette in the tape recorder and rewind it to the beginning. After turning on the computer, press ENTER in response to the 'CASS?' question if you own a Model III. Both Model I and Model III owners must press ENTER in response to the 'MEMORY SIZE?' question. When you are in BASIC, type CLOAD, press the PLAY button on the tape recorder, and press ENTER on the keyboard. The first program, Bar Graphing, will load into the TRS-80's memory. After the program is loaded, type RUN and press ENTER.

To load and run each subsequent program, type CLOAD, press the PLAY button on the tape recorder, and press ENTER on the keyboard. The order of the programs on the cassette (each side) is: Bar Graphing, Cartesian Coordinate Graphing, Polar Graphing, Parametric Graphing, Linear Regression and Parabolic Regression. Their respective filenames are: BARGRAPH, CARTESIA, POLAR, PMETRIC, LREGRESS, AND PREGRESS.

If you wish to load a program that is located further on the tape, type CLOAD followed by the filename of the program enclosed in quotation marks, instead of typing CLOAD alone. For example, if you have finished using the Bar Graphing program, and you now wish to run the Linear Regression program, type CLOAD "LREGRESS", press the PLAY button on the tape recorder, and press ENTER on the keyboard. The computer will bypass all other files and will load the Linear Regression program.

## Bar Graph

by Ronald E. Tomchin

This program will draw bar and line graphs for up to six different categories. First enter the title and subtitle for the chart. Then enter the label and value for the first category separated by a comma. For example, if you have 37 oranges, you would type ORANGES,37 and press ENTER. Do the same for the remaining values. If you have less than six values, simply enter a comma (,) and press ENTER.

The program will then display the bar chart on the screen. When you finish viewing the bar graph, enter a command as follows:

Enter B to redraw the bar graph.

Enter L to redraw the graph as a line.

Enter P to print the graph at the line printer.

Enter N to draw more graphs using new values.

Enter Q to end the program.

Note that these commands will be displayed after each graph is drawn.

### Printout Options

If you entered P in order to print the graph at the line printer, the program will ask you to indicate the type of printer you have. Enter a command as follows:

Enter G if you have a printer with TRS-80 graphics characters, such as the Epson MX-80.

Enter T if your printer has no TRS-80 graphics characters.

Enter C if you choose to cancel the printout.

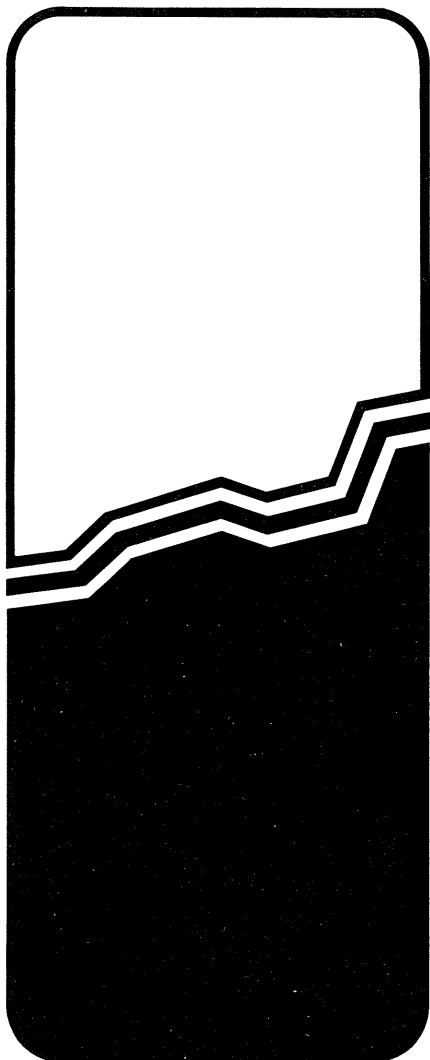
If you enter G or T in order to print the graph on the line printer, make sure that your printer is turned on beforehand. If the printer is not ready when either of these two commands are entered, the message

**LINE PRINTER NOT READY**

will appear at the bottom of the screen for a short period of time. The program will then ask for a new command (B/L/P/N/Q). Pressing any key will cause the program to continue.

This program assumes that LPRINT CHR\$(12) will send a form feed to the line printer. If your printer does not recognize this as a form feed, change line 4050 in the program to give the variable FF the proper value for the printer form feed.

Text printers will print an asterisk in place of any graphics characters on the screen. To change this to another character, change the 42 in line 4060 to the ASCII code of the new character. Try 35, 88, 120, or 127 for "#", "X", "x", or DELETE, respectively.



## Polar Coordinate Graphing

by David W. Mawdsley

The Polar Coordinate Graphing program provides plots in polar coordinates. Enter the function of  $t$  (theta) as line 730. For example, to graph

$$r = \sin(t) + \cos^2(t)$$

enter

```
730 R=SIN(T)+COS(T)↑2
```

Note: You may specify later whether  $t$  is in radians or degrees.

After the function has been entered, type RUN 210 and press ENTER. When asked, specify whether  $t$  is measured in radians or degrees. Then enter the minimum and maximum values of  $t$  desired (a maximum of greater than 360 degrees is permitted). Also, specify the interval of  $t$  you want. Smaller values of  $t$  will provide greater resolution but will take longer to plot.

It will take some time to calculate the plot. Once the plot has started, you may stop it at any time by pressing the SHIFT and @ keys simultaneously. After the graph is drawn, enter a command as follows:

Enter G to print the graph at a line printer with TRS-80 graphics characters, such as the Epson MX-80.

Enter T to print the graph at a line printer without TRS-80 graphics.

Enter Q to end the program.

Press the spacebar to repeat the program.

### Printout Options

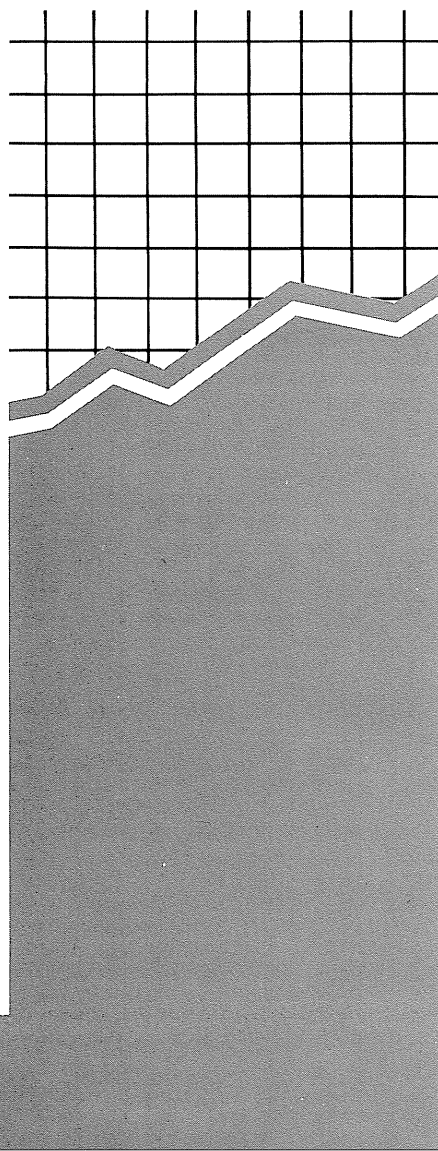
If you enter G or T in order to print the graph at the line printer, make sure that your printer is turned on beforehand. If the printer is not ready when either of these two commands are entered, the screen will clear and the message

LINE PRINTER NOT READY

will appear on the screen for a short period of time. The program will then continue. If you do not wish to wait, pressing any key will cause the program to continue.

This program assumes that LPRINT CHR\$(12) will send a form feed to the line printer. If your printer does not recognize this as a form feed, change line 4050 in the program to give the variable FF the proper value for the printer form feed.

Text printers will print an asterisk in place of any graphics characters on the screen. To change this to another character, change the 42 in line 4060 to the ASCII code of the new character. Try 35, 88, 120, or 127 for "#", "X", "x", or DELETE, respectively.



## by David W. Mawdsley

$$x = f(t) \quad y = f(t)$$

then enter

```
560 X=1+COS(T) ↑ 2
570 Y=T+T ↑ 2
```

When you are finished viewing the graph, enter a command as follows:

Enter Q to end the program.

Press the spacebar to repeat the program.

If you enter G or T in order to print the graph at the line printer, make sure that your printer is turned on beforehand. If the printer is not ready when either of these two commands are entered, the screen will clear and the message

**LINE PRINTER NOT READY**  
will appear on the screen for a short period of time. The program will then continue. If you do not wish to wait, pressing any key will cause the program to continue.

This program assumes that LPRINT CHR\$(12) will send a form feed to the line printer. If your printer does not recognize this as a form feed, change line 4050 in the program to give the variable FF the proper value for the printer form feed.

Text printers will print an asterisk in place of any graphics characters on the screen. To change this to another character, change the 42 in line 4060 to the ASCII code of the new character. Try 35, 88, 120, or 127 for "#", "X", "x", or DELETE, respectively.

## Cartesian Coordinate Graphing

by David W. Mawdsley

This program will draw a standard cartesian coordinate (x,y) graph. Before the program is run, the function to be graphed must be entered as line 560. For example:

$$y = 10x + \sin(x)/15x^2$$

would be entered as:

```
560 Y=10*X+SIN(X)/(15*X ↑ 2)
```

If you forget to enter the function, the program will remind you.

Once the function has been entered, type RUN 150 and press ENTER. Enter the minimum and maximum values of x. The program will then take a few seconds to compute the points on the graph. A descriptive section about the function will follow. After the graph is drawn, enter a command as follows:

Enter G to print the graph at a line printer with TRS-80 graphics characters, such as the Epson MX-80.

Enter T to print the graph at a line printer without TRS-80 graphics.

Enter Q to end the program.

Press the spacebar to repeat the program.

### Printout Options

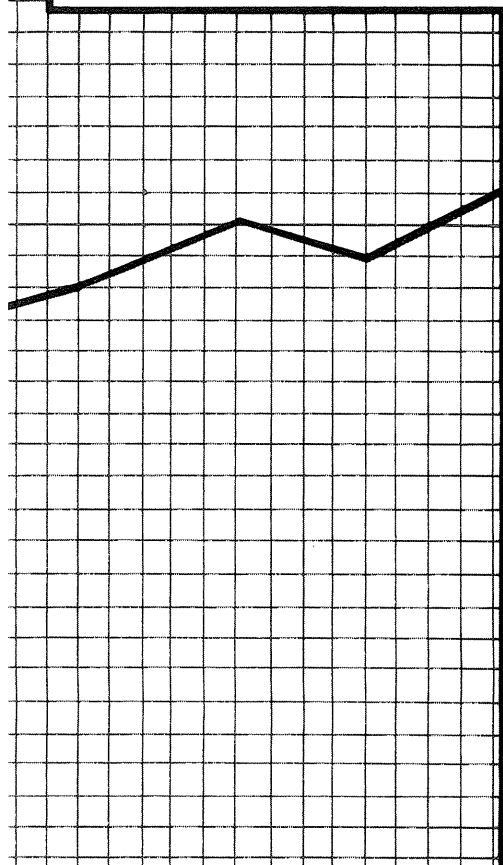
If you enter G or T in order to print the graph at the line printer, make sure that your printer is turned on beforehand. If the printer is not ready when either of these two commands are entered, the screen will clear and the message

#### LINE PRINTER NOT READY

will appear on the screen for a short period of time. The program will then continue. If you do not wish to wait, pressing any key will cause the program to continue.

This program assumes that LPRINT CHR\$(12) will send a form feed to the line printer. If your printer does not recognize this as a form feed, change line 4050 in the program to give the variable FF the proper value for the printer form feed.

Text printers will print an asterisk in place of any graphics characters on the screen. To change this to another character, change the 42 in line 4060 to the ASCII code of the new character. Try 35, 88, 120, or 127 for "#", "X", "x", or DELETE, respectively.



## Linear Regression Parabolic Regression

by Robert Lawrence

These two programs are not graphic routines, but do provide a method for using the graphic routines with paired data. Regression routines are used to fit data to a simple algebraic equation. You are strongly urged to review a good book on statistics if you are not familiar with the assumptions and limitations of regression procedures.

To enter data from the keyboard, first enter the x-value (independent variable), then the accompanying y-value (dependent variable). When you have finished entering the data, enter 99999. You may then review the data in order to make corrections. If changes are necessary, enter the row number, followed by the corrected x-value and y-value. All three entries should be separated by commas.

After the regression analysis is displayed on the screen, you may enter x-values in order to obtain predicted y-values.

Both of these programs feature routines to allow you to save data on cassette files. When the test has been completed, place the cassette in the recorder, press the PLAY and RECORD buttons, and press ENTER on the keyboard. When the computer has finished writing the data to the file, it will write a final record with the number 99999. In this way, cassette data tapes created with one program can be used in another program.

To read a tape at a later time, specify 99999 as the number indicating the end of data values. Then place the tape containing the data in the recorder, press the PLAY button, and press ENTER on the keyboard. The data will be loaded into the TRS-80's memory.

If you have the disk version, you may save data in disk files. After the regression equation has been calculated, press Y in response to 'DO YOU WANT TO RECORD DATA ON DISK (Y/N)?'. You will then be asked to specify a filename for the data. If a file by the same name already exists on the disk, you will be asked to either overwrite the file with the new data, or to specify a new filename.

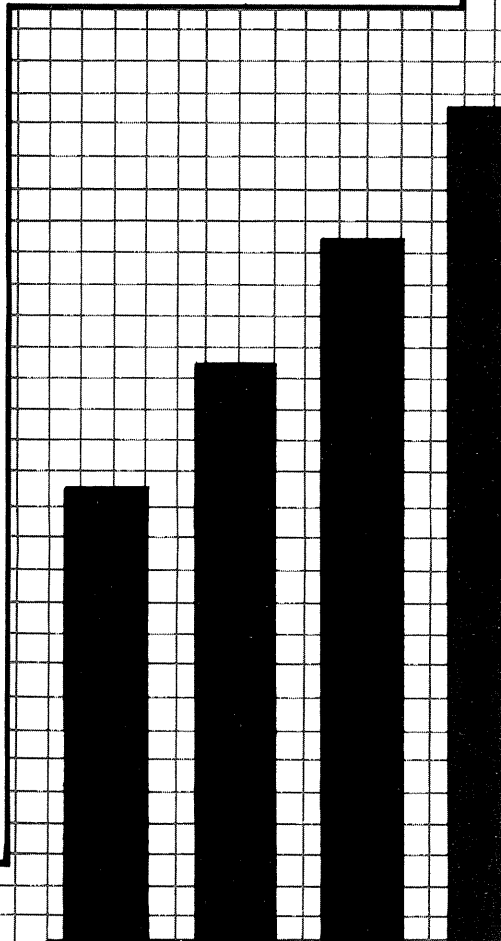
To read a disk file, simply press Y when you are asked if the data is from a disk file. Then enter the first five letters of the filename. If no such file exists on disk, you have the option of either specifying a new filename, or of entering data manually from the keyboard.

The linear regression program provides the equation of a line that best fits the data. This line is of the form:

$$y = A + Bx$$

The parabolic regression routine provides a similar function except the equation to which the data is fitted is now:

$$y = A + Bx + Cx^2$$



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